this anticyclone extended southward to the vicinity of the hurricane and changed the direction of movement of the air in the intermediate and higher levels toward the west. However, the air movement was slight in the levels that control the direction of movement of tropical cyclones, and the westward progress was quite slow. This condition continued for about two days, although pressure gradually decreased over the Middle Atlantic and North Atlantic States. By the evening of the 24th a trough of low pressure, moving eastward, extended from western Quebec southwestward to the east Gulf States, and as is always the case with such troughs, the wind aloft changed to southerly some distance to the eastward with the result that the tropical storm began to move northward, and a little later to the north-northeastward. Hurricane winds and mountainous seas were reported from vessels within the storm area, especially during the 23d–25th, with barometer readings below 29 inches, the lowest reported being 28.67 inches.

The rate of movement of this storm was very rapid after the morning of the 25th, at which time its center was in latitude 26° N. and longitude 76° W. The center passed a short distance east of Cape Hatteras about 9 p. m. of the 25th and immediately east of Nantucket, Mass., about 1 p. m. the following day. The highest wind velocity reported from a land station was 72 miles an hour from the northwest at Cape Hatteras. A number of vessels were somewhat damaged by the hurricane winds and mountainous waves off the south Atlantic and middle Atlantic coasts and along the trans-Atlantic steamer lanes, especially between longitudes 65° and 70° W. The S. S. *Arabic* was hard hit by the hurricane and several passengers were injured. No reports have been received of material damage along the Atlantic coast.

Advisory warnings of the location, intensity, and progress of this, one of the greatest hurricanes in both intensity and extent ever experienced off the Atlantic coast, were issued twice daily from the time the disturbance was first noted. Timely warnings were broadcast by radio of the probable increase in intensity of this storm after it passed Porto Rico and vessels bound for the regions traversed by the hurricane were advised to exercise caution. The first storm warnings in connection with this storm were displayed on the 22d from Cape Hatteras to Jupiter Inlet, and when it became evident that the storm was moving westward the warnings were extended southward to Miami. On the morning of the 25th, shortly after the hurricane had recurved to the northward, storm warnings were extended north of Cape Hatteras to the Virginia Capes, and at 6 p. m. to Atlantic City. Hurricane warnings were ordered displayed at 4 p. m. from Beaufort, N. C., to Cape Henry. Northeast storm warnings were displayed as far north as Boston at 9:30 p. m. of the 25th and were extended to Eastport, Me., on the following morning.

The second tropical disturbance evidently developed much farther east than the first, insamuch as it was already a storm of considerable intensity when it appeared near Dominica on the 27th. By the time it reached the Virgin Islands it had attained hurricane intensity. The barometer fell to 29 inches at St. Thomas at 3 a. m. of the 29th and great damage was done by the storm in these islands. A number of lives were lost, hundreds of houses were destroyed and thousands damaged, and much damage was done to crops. So great were the losses in the Virgin Islands that appeal was made to the American Red Cross for substantial aid.

After this storm passed over the Virgin Islands few vessel reports were received from its vicinity and as its center passed about 150 miles east of Turks Island and the same distance west of Bermuda the barometer did not fall below 29.78 inches at either place; but Bermuda reported a wind velocity of 36 miles an hour from the southwest the morning of September 3. The S. S. *Ponce* reported a barometer reading of 29.16 inches and a southwest wind of force 9 (Beaufort scale) on the 2d in latitude 28° N. and longitude 68° 40′ W. This storm was of much smaller diameter and less intensity than the previous hurricane and since the number of vessels in the part of the ocean over which it passed is usually quite small, it is not surprising that few reports were received by radio from vessels near the hurricane center. Advisory warnings regarding the approximate location, direction of movement, and intensity of this storm were issued twice daily, and vessels bound for the regions affected were advised to exercise caution.

No storm warnings were issued during the month, except those previously referred to in connection with the first tropical storm.—*C. L. Mitchell.*

CHICAGO FORECAST DISTRICT

The weather conditions during the month were rather unusual in the Chicago Forecast District. It was unseasonably cool most of the time in the north and central portions of the district, especially during the first two decades, but at the same time it was rather warm in the southwestern portion. At the close of the month a warm wave had become general, as it was reaching eastward over the Middle States.

The rainfall, too, was unusual in its distribution, being heavy to excessive in the eastern and east-central portions of the district, but somewhat deficient in the more westerly portions. The rains were chiefly in connection with thunderstorms, and the amounts extraordinary at some points in the Middle States, especially in portions of Illinois, Wisconsin, Minnesota, Iowa, and Missouri.

With few exceptions, warnings were not necessary and those issued were confined to small-craft warnings on the Great Lakes and frost warnings to the cranberry marshes of Wisconsin.

The warnings in the interests of the cranberry growers were highly satisfactory, as usual. The following letter, under date of August 14, was received from the Cranberry Growers Association of Wisconsin:

> Members of this association held their annual summer session at the pavilion near Nehoosa last Tuesday, August 12, at which time a most hearty and unanimous vote of thanks was accorded you for the invaluable assistance you have rendered the cranberry growers in the past by sending out the weather reports and warnings to the various districts.
>
> It is a favor of untold value to every grower, and I assure you is very much appreciated by all.
>
> —*H. J. Cox.*

NEW ORLEANS FORECAST DISTRICT

The characteristic summer HIGH of the South Atlantic States, with pressure diminishing gradually westward, attended by daytime showers in the east Gulf States and on the middle Gulf coast, was charted on only a few days during this month. High pressure over the northeastern States was a more frequent condition and at other times the pressure was slightly higher over the Lower Mississippi Valley than on the South Atlantic coast. This distribution of pressure does not favor converging winds in Gulf coast sections and one result was the abnormally hot, dry weather prevailing in the eastern and southern portions of this forecast district during

August, 1924. The greatest deficiency of precipitation occurred on the immediate coast of Texas, with only a "trace" of rain at Galveston and 0.02 inch at Corpus Christi. In general features of the pressure distribution over the Atlantic and Gulf States and of rainfall on the Texas coast, this August resembles August, 1902, when there was no rain at Galveston and only a "trace" at Corpus Christi; but August, 1902, on the whole, was drier in the interior of Texas than August, 1924.

No high winds occurred and no warnings were issued. —*R. A. Dyke.*

DENVER FORECAST DISTRICT

The distribution, direction, and velocity of movement, and intensity of areas of high and low atmospheric pressure during August were such as to fail to produce the usual precipitation from thunderstorms in the Denver district, except in western Colorado, where precipitation was normal. Temperatures were generally above normal over the district. The deficiency in precipitation in eastern Colorado was most pronounced, the month being one of the driest on record in that section. High-pressure areas, which in conjunction with Arizona low areas, are effective usually in producing summer thunderstorms in eastern Colorado, either were too feeble, too rapid in movement, or following a course too far northward to cause normal showers. As precipitation had been deficient throughout the summer, the dryness became acute during the latter half of the month.

On the evening of the 18th a low-pressure area, moving slowly over Colorado, indicated increasing westerly to northerly winds, very low humidity and high temperatures in the eastern portion of the State, and consequently forest officials were warned of the expected increase in the already high fire hazard. As low pressure continued over this region and developed somewhat in intensity, similar warnings were issued on the evenings of the 19th and 20th. During the period covered by these warnings the relative humidity at Denver was very low, the lowest observed being 7 per cent and the highest temperature was 91°, while at the elevated lookout station on Devil's Head, within the forested region, the wind movement was high and a maximum velocity of 40 miles an hour was recorded at one observation.

Owing to the demand for the information and the graveness of the situation, advice was published, beginning on the 21st, each morning during the remainder of the month relative to the fire hazard as affected by the meteorological conditions expected. Appreciation was expressed for the service rendered by the Weather Bureau, as it proved of value in coping with forest fires.

No other warnings were required.—*Lawrence C. Fisher.*

SAN FRANCISCO FORECAST DISTRICT

The outstanding feature of the weather in this district during August, 1924, was a small storm which appeared near Sitka on the 16th, moved southward along the coast on the 17th, and passed inland over British Columbia, near the international boundary, on the 18th. It gave light but general rain over the northern portion of this district and extended southward into the extreme northern counties of California. The rain greatly relieved the dangerous forest-fire condition in the areas in which it fell.

During the first decade the temperature was nearly normal throughout the district. In the first three days of the second decade there was a marked warming up in the northern portion of the district, which was followed by unsettled and cooler weather from the 16th to the 21st, over the entire district. A marked warm spell accompanied by low humidity prevailed over the interior of the entire district from the 23d to the 28th. On the afternoon of the 27th the record for high temperature in August was broken at Fresno, where the thermometer reached 110°.

The fire-weather hazard was high in the interior sections during the greater portion of the month and advices were broadcast twice daily covering this condition. No other warnings were required.—*G. W. Willson.*

RIVERS AND FLOODS

By H. C. FRANKENFIELD, Meteorologist

Aside from that in the Illinois River, no extensive floods occurred in the principal rivers of the country during August, 1924. Considerable damage to farms, rural communities, highways, and railroad property, and some loss of life occurred, however, from local floods which followed unusually heavy rainfall during the first three weeks of the month over eastern Iowa, southern Wisconsin, and northern Illinois. In the latter State the major portion of the damage—principally to harvested crops, livestock, and highway and railroad bridges—occurred in Henry, Knox, Mercer, and Stark Counties, following the rains of the 19th and 20th.

In east-central Iowa during the same period local damage of a similar character was considerable and two fatalities occurred.

In southern Wisconsin, following the very excessive rains of August 3–6, the highest flood of record and nine fatalities occurred in the Milwaukee River Valley, and losses and damage in this and other sections was estimated at upward of $1,000,000. In the Milwaukee River the current was so swift that large steamers were compelled to anchor outside the harbor, some being delayed for three days. A moderate repetition of the conditions occurred with one fatality between Lake Winnebago and Lake Michigan following the rains between the 19th and 21st.

The more general flood in the Illinois River, occurring less than two weeks after the subsidence of the flood of late June–July, was brought about by the same general rains of August 19–21. This flood was chiefly remarkable for its time of occurrence, as high stages in the late summer are rare in the Illinois River. Stages in the upper river were generally somewhat higher than during the late June–July flood; but losses, which in the latter were considerable to crops and in finally preventing late planting, were not materially increased in this respect. Flood warnings were timely and well verified. The property losses were enormous when the limited territory involved is considered. Detailed statements could not be obtained, but newspaper estimates were as high as $3,000,000, mainly along the smaller tributary streams, with railroads probably the greatest sufferers.

The same general rainfall conditions also caused a local flood in the Mississippi River district from the mouth of the Des Moines to the mouth of the Illinois River. Warnings were issued on August 23 and very little damage was done, about $5,000 in crops, as the lowlands had been overflowed since early July.

On August 11 heavy local mountain rains caused a severe flood in the Galisteo River, a tributary of the Rio Grande, in northern New Mexico. The town of Lamy was inundated, and the losses in the town and adjacent country were probably as much as $500,000.